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AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111
Serial Number: 10/750,090
Filing Date: December 31, 2003
Title: BEHAVIORAL MODEL BASED MULTI-THREADED ARCHITECTURE

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A method comprising:
determining a state of a variable corresponding to a semaphore;
generating a semaphore entry for a thread of instructions prior to dispatch of the thread for execution if the variable is in a first state, wherein the first state indicates that the semaphore is to notify the thread that the semaphore has been acquired; and
dispatching the thread of instructions for execution prior to generating the semaphore entry for the thread if the variable is in a second state, wherein the second state indicates that the semaphore is not to notify the thread that the semaphore has been acquired,
wherein the semaphore is to cause change in a state of the thread via a thread scheduler.
2. (Currently Amended) The method of claim 1 further comprising dispatching the thread of instructions for execution and during the thread execution generating a semaphore entry for the thread ~~if the variable is in a third state.~~
3. (Original) The method of claim 1 wherein the variable corresponding to the semaphore indicates whether a semaphore entity is to automatically transmit a message indicating control of the semaphore to execution circuitry corresponding to the thread of instructions.
4. (Original) The method of claim 1 wherein generating the semaphore entry for the thread of instructions prior to dispatch of the thread of instructions if the variable is in the first state comprises:
transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions; and
dispatching the thread of instructions to execution circuitry in response to receiving a signal indicating that the semaphore entity has processed the message.

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5. (Original) The method of claim 4 wherein the transmitting the message to the semaphore entity and dispatching the thread of instructions are pipelined.
6. (Original) The method of claim 4 wherein the message comprises a semaphore identifier field, a thread identifier field, and a field corresponding to the variable.
7. (Original) The method of claim 1 wherein dispatching the thread of instructions for execution prior to generating the semaphore entry for the thread if the variable is in a second state comprises:
- dispatching the thread of instructions to execution circuitry; and
 - transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to a signal indicating that execution of the thread of instructions has commenced.
8. (Original) The method of claim 7 wherein the dispatching of the thread of instructions and transmitting of the message to the semaphore entity are pipelined.
9. (Original) The method of claim 7 wherein the message comprises a semaphore identifier field, a thread identifier field, and a field corresponding to the variable.
10. (Currently Amended) The method of claim 2 wherein dispatching the thread of instructions for execution and during the thread execution generating the semaphore entry for the thread ~~if the variable is in a third state~~ comprises:
- dispatching the thread of instructions to execution circuitry; and
 - transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to the execution of a set of instructions.
11. (Original) The method of claim 10 wherein the set of instructions comprises an acquire semaphore instruction.

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12. (Original) The method of claim 10 wherein the set of instructions comprises an acquire semaphore with auto-release instruction.

13. (Currently Amended) An apparatus comprising:
means for determining a state of a variable corresponding to a semaphore;
means for generating a semaphore entry for a thread of instructions prior to dispatch of the thread for execution if the variable is in a first state, wherein the first state indicates that the semaphore is to notify the thread that the semaphore has been acquired; [[and]]
means for dispatching the thread of instructions for execution prior to generating the semaphore entry for the thread if the variable is in a second state, wherein the second state indicates that the semaphore is not to notify the thread that the semaphore has been acquired, wherein the semaphore is to cause change in a state of the thread via a thread scheduler; [[and]]
dispatching the thread of instructions for execution and during the thread execution generating a semaphore entry for the thread ~~if the variable is in a third state; and~~
a storage device to store the semaphore entry.

14. (Currently Amended) The apparatus of claim 13 further comprising means for dispatching the thread of instructions for execution and during the thread execution generating a semaphore entry for the thread ~~if the variable is in a third state.~~

15. (Original) The apparatus of claim 13 wherein the means for generating the semaphore entry for the thread of instructions prior to dispatch of the thread of instructions if the variable is in the first state further comprises:

means for transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions; and

means for dispatching the thread of instructions to execution circuitry in response to receiving a signal indicating that the semaphore entity has processed the message.

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16. (Original) The apparatus of claim 13 wherein the means for dispatching the thread of instructions for execution prior to generating the semaphore entry for the thread if the variable is in a second state further comprises:

means for dispatching the thread of instructions to execution circuitry; and

means for transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to a signal indicating that execution of the thread of instructions has commenced.

17. (Currently Amended) The apparatus of claim 14 wherein the means for dispatching the thread of instructions for execution and during the thread execution generating the semaphore entry for the thread ~~if the variable is in a third state~~ comprises:

means for dispatching the thread of instructions to execution circuitry; and

means for transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to the execution of a set of instructions.

18. (Currently Amended) An apparatus comprising:

a semaphore entity to maintain entries for a semaphore indicating one or more threads of instructions requesting control of the semaphore;

execution circuitry to execute one or more threads of instructions; and

a thread dispatcher coupled with the semaphore entity and the execution circuitry, the thread dispatcher to determine a state of a variable corresponding to the semaphore, generate a message to the semaphore entity to cause a semaphore entry for a thread of instructions to be generated prior to dispatch of the thread of instructions to the execution circuitry for execution if the variable is in a first state, wherein the first state indicates that the semaphore is to notify the thread that the semaphore has been acquired, and dispatch the thread of instructions to the execution circuitry for execution prior to generating a message to the semaphore entity to cause the semaphore entry for the thread to be generated if the variable is in a second state, wherein the second state indicates that the semaphore is not to notify the thread that the semaphore has been acquired.

wherein the semaphore is to cause change in a state of the thread via a thread scheduler.

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19. (Currently Amended) The apparatus of claim 18 wherein the thread dispatcher further dispatches the thread of instructions for execution and without generating a semaphore entry for the thread ~~if the variable is in a third state.~~

20. (Original) The apparatus of claim 18 wherein the semaphore entity maintains one or more semaphores.

21. (Original) The apparatus of claim 18 wherein the message comprises a semaphore identifier field, a thread identifier field, and a field corresponding to the variable.

22. (Original) The apparatus of claim 18 wherein the variable corresponding to the semaphore indicates whether a semaphore entity is to automatically transmit a message indicating control of the semaphore to execution circuitry corresponding to the thread of instructions.

23. (Original) The apparatus of claim 18 wherein generating a message to the semaphore entity to cause a semaphore entry for a thread of instructions to be generated prior to dispatch of the thread of instructions to the execution circuitry for execution if the variable is in a first state comprises transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions, and dispatching the thread of instructions to the execution circuitry in response to receiving a signal indicating that the semaphore entity has processed the message.

24. (Original) The apparatus of claim 23 wherein the operations of transmitting the message to the semaphore entity and dispatching the thread of instructions are pipelined.

25. (Original) The apparatus of claim 18 wherein dispatching the thread of instructions to the execution circuitry for execution prior to generating a message to the semaphore entity to cause the semaphore entry for the thread to be generated if the variable is in a second state comprises dispatching the thread of instructions to execution circuitry, and

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transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to a signal indicating that execution of the thread of instructions has commenced.

26. (Original) The apparatus of claim 25 wherein the operations of transmitting the message to the semaphore entity and dispatching the thread of instructions are pipelined.

27. (Original) The apparatus of claim 19 wherein the execution circuitry generates a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to the execution of a set of instructions.

28. (Currently Amended) A system comprising:
a memory controller;
a semaphore entity to maintain entries for a semaphore indicating one or more threads of instructions requesting control of the semaphore;
execution circuitry to execute one or more threads of instructions; and
a thread dispatcher coupled with the semaphore entity, the execution circuitry and the memory controller to determine a state of a variable corresponding to the semaphore, generate a message to the semaphore entity to cause a semaphore entry for a thread of instructions to be generated prior to dispatch of the thread of instructions to the execution circuitry for execution if the variable is in a first state, wherein the first state indicates that the semaphore is to notify the thread that the semaphore has been acquired, dispatch the thread of instructions to the execution circuitry for execution prior to generating a message to the semaphore entity to cause the semaphore entry for the thread to be generated if the variable is in a second state, wherein the second state indicates that the semaphore is not to notify the thread that the semaphore has been acquired, wherein the semaphore is to cause change in a state of the thread via a thread scheduler, and dispatch the thread of instructions for execution and without generating a semaphore entry for the thread ~~if the variable is in a third state~~.

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29. (Currently Amended) The system of claim 28 wherein the thread dispatcher further dispatches the thread of instructions for execution and without generating a semaphore entry for the thread ~~if the variable is in a third state~~.

30. (Original) The system of claim 28 wherein the message comprises a semaphore identifier field, a thread identifier field, and a field corresponding to the variable.

31. (Original) The system of claim 28 wherein the variable corresponding to the semaphore indicates whether a semaphore entity is to automatically transmit a message indicating control of the semaphore to execution circuitry corresponding to the thread of instructions.

32. (Original) The system of claim 28 wherein generating a message to the semaphore entity to cause a semaphore entry for a thread of instructions to be generated prior to dispatch of the thread of instructions to the execution circuitry for execution if the variable is in a first state comprises transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions, and dispatching the thread of instructions to the execution circuitry in response to receiving a signal indicating that the semaphore entity has processed the message.

33. (Original) The system of claim 28 wherein dispatching the thread of instructions to the execution circuitry for execution prior to generating a message to the semaphore entity to cause the semaphore entry for the thread to be generated if the variable is in a second state comprises dispatching the thread of instructions to execution circuitry, and transmitting a message to a semaphore entity to request control of the semaphore by the thread of instructions in response to a signal indicating that execution of the thread of instructions has commenced.

34. (Original) The system of claim 28 wherein the operations of transmitting the message to the semaphore entity and dispatching the thread of instructions are pipelined.